OFFICIAL COORDINATION REQUEST FOR NON-ROUTINE OPERATIONS AND MAINTENANCE

COORDINATION Title: 15 IHR 006 Ice Harbor Spillbay 2 Ogee/Deflector Post-Construction Evaluation
COORDINATION DATE: March 11, 2015
PROJECT- Ice Harbor Dam
RESPONSE DATE- 12 March 2015 (FPOM Meeting)

Description of the problem: A research study is being planned for Ice Harbor Dam titled "Spillbay 2 Ogee/Deflector Post-Construction Evaluation" (Section 6.2.2 in the 2015 FPP Appendix A). This study requires the installation of a fish release pipe at the RSW in spillbay 2. Installation will require a mobile crane to hoist the release pipe over the spillway forebay rail and lower it into place for attachment on the downstream side of the RSW walkway. It is expected that a second mobile crane will be needed to hoist a man-basket to position the contractor for pipe attachment. Installation is tentatively scheduled to occur between 19-22 March and expected to require approximately 1.5 days. The study will ~~tentatively~~ occur ~~3-9~~6-13 April with pipe removal on ~~approximately 10~~14 April. ~~Date of pipe removal may shift depending upon when the study actually begins. Final pipe removal date will be provided to FPOM once confirmed.~~

Project support is not expected for installation as spillbays 1-4 are locked out for spillbay 2 construction demobilization. Project requirements such as removing safety clearances and pulling RSW stop logs will take place as scheduled for the construction contract.

Project support will be required for pipe removal. A safety clearance will be required on spillbays 1-3 for overwater work and BRZ safety boat access in the forebay. It may also be necessary to install RSW stop logs. Pipe removal is expected to require 1 day.

To provide optimal egress and recapture rates for released fish we are requesting an adjusted spill pattern removing 1 stop from bays 4, 6 and 7 and applying 1 stop to bay 1 and 2 stops to bay 3 (~4kcfs total). Spill will not be reduced, only reallocated.

Type of outage required: A safety clearance on spillbays 1-3 will be required on ~~approximately 10~~14 April for the pipe removal. The RSW will not be available for fish passage on this day for approximately 8 hours 0700-1700. An alternative spill pattern has been developed for this day.

Impact on facility operation: Impact on project staff and maintenance activities are expected to be minimal; however, an Ice Harbor Dam employee will need to hold the safety clearance for locking out spillbays 1-3 for pipe removal. The contractor will provide mobile cranes to complete the work. This will prohibit fish passage through the RSW for approximately 8 hours on ~~1 day~~14 April.

The required Project support for pipe installation and removal is currently being coordinated through District Operations and with the Ice Harbor Project.

Proposed Schedule:

- Installation equipment and release pipe in spillbay 2: 19-22 March, 2015
- Study execution: ~~3-9~~6-13 April, 2015
- Release pipe removal: ~~10-~~14 April, 2015
- Equipment removal: ~~10~~13-17~~15~~ April, 2015

Length of time for repairs: NA

Expected impacts on fish passage:

Juvenile Passage: An RSW outage during the spill season will affect juvenile fish passage. RSW passage averages approximately 40% for yearling Chinook and juvenile steelhead and approximately 60% for subyearling Chinook (Ham et al. 2009). ~~RSW p~~Passage survival averages approximately 95% for the RSW and 96% conventional spill across species and runs (Ham et al. 2009). In the event of spillbays 2 and 3 being locked out for release pipe removal it is reasonable to assume that fish passage will shift from those bays to spillbays 4-10. This would result in smolts passing a route with equally high survival, but lower passage effectiveness. This may result in passage delays on the scale of approximately 1-2 hours (Ham et al. 2009). Ham et al. (2009) reported only one of seven studies finding statistical differences in forebay residence times among spill patterns and treatments. While there is expected to be some affect (likely passage delay) of an RSW outage on 10 April, a relatively small proportion of smolts will experience this affect of an 8 hour RSW outage as ≤ 10% of the runs will pass by 15 April compared to the bulk of the runs passing by April 30th (Tables 1 and 2).

A spill pattern shift between 8-14 April will affect juvenile salmon and steelhead passage; however, the affect is presumed to be minimal. The proposed adjusted spill pattern includes 1 stop (~1.7 kcfs) in bay 1 and 2 stops (~3.4 kcfs) in bay 3 with the remainder of the spillway loaded in a bulk pattern with the majority of flow passing bays 4-6. A 2004 radio telemetry study (Eppard et al. 2005) resulted in higher spill and fish passage efficiency, faster tailrace egress and higher survival for yearling Chinook passing the bulk spill pattern compared to flat spill. A more recent radio telemetry study resulted in the RSW having significantly higher passage than spillbays 1 or 3 with comparable survival for yearling Chinook and steelhead when spilling 45 kcfs in a near flat pattern (Axel et al. 2009). Proposed spill for bays 1 and 3 is much less than that tested by Axel et al. (2009) and is unlikely to result in rerouting a large proportion of juveniles from the RSW into conventional spill.

Adult Passage: The Ice Harbor RSW provides a safe fallback route for adult steelhead during this early April time period. Boggs et al. (2005) reported ≤ 5% steelhead fallback at Ice Harbor across the entire study period between 1997-2003. Based on eight previous years of window count data (2007-2014) it is expected that on average ≤ 50 (range = 3 - 104) wild adult steelhead may pass Ice Harbor each day in early April (Figure 1; Table 3). These data suggest that approximately 2 adult steelhead may fall back on a given day. With a 10 April RSW outage these fish would either not fallback or would pass a conventional spillbay. Therefore, it is difficult to accurately assess affects on adult steelhead. Kelt generally experience approximately 93-95% conventional spillbay survival (Colotelo et al. 2013) which may be assumed for upriver migrating adults. Assuming only a couple steelhead would fall back within an 8 hour period and would pass via spillbay, It may be reasonable to assume a minor impact to adults during the RSW outage.

We expect no impact to adult passage as the proposed adjusted spill pattern maintains adult attraction flow to the north fishway. It is unexpected that the proposed adjusted spill pattern will worsen the powerhouse eddy that is currently occurring with only unit 1 operating.

Comments from agencies:

FPOM meeting March 12, 2015:

15IHR006 spillway ogee. Spill starts on 3 April. NWW would like to start bio testing on 3 April. Equipment installation would occur prior to spill starting. Biological testing would occur between 3-10 April. Trumbo would like to take spillbays 1-3 out to allow for equipment removal after the study is complete. Kiefer wanted to make sure fish are released at the known problem area. Trumbo confirmed that would happen. **FPOM concurred with this MOC.**

Final results:

Thank you,

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Table 1. Migration timing characteristics for yearling Chinook salmon passing Lower Monumental Dam (DART 2015). Data not available for Ice Harbor.

Year	Passage Dates								Middle 80% Days
	First	1%	5%	10%	50%	90%	95%	Last	
2005	04/02	04/04	04/08	04/11	04/23	04/29	04/30	05/01	19
2006	04/07	04/10	04/25	04/28	04/29	05/01	05/01	05/01	4
2007	04/01	04/05	04/08	04/08	04/14	04/30	05/01	05/01	23
2008	04/01	04/11	04/13	04/16	04/23	04/30	04/30	04/30	15
2009	04/01	04/06	04/09	04/09	04/14	04/28	04/29	05/01	20
2010	04/01	04/14	04/17	04/17	04/23	04/29	04/29	04/29	13
2011	04/01	04/13	04/16	04/22	04/28	05/01	05/01	05/01	10
2012	04/03	04/03	04/09	04/12	04/27	04/30	04/30	04/30	19
2013	04/01	04/01	04/07	04/13	04/22	05/01	05/01	05/01	19
2014	04/01	04/22	04/29	04/29	04/30	05/01	05/01	05/01	3

Table 2. Migration timing characteristics for juvenile steelhead passing Lower Monumental Dam (DART 2015). Data not available for Ice Harbor.

Year	Passage Dates								Middle 80% Days
	First	1%	5%	10%	50%	90%	95%	Last	
2005	04/02	04/07	04/08	04/10	04/16	04/30	05/01	05/01	21
2006	04/04	04/13	04/25	04/28	04/29	05/01	05/01	05/01	4
2007	04/01	04/05	04/14	04/14	04/26	05/01	05/01	05/01	18
2008	04/01	04/16	04/18	04/19	04/26	04/30	04/30	04/30	12
2009	04/01	04/06	04/12	04/16	04/25	04/30	04/30	05/01	15
2010	04/03	04/17	04/20	04/20	04/26	04/29	04/29	04/29	10
2011	04/01	04/04	04/07	04/16	04/25	05/01	05/01	05/01	16
2012	04/03	04/03	04/06	04/15	04/27	04/30	04/30	04/30	16
2013	04/01	04/07	04/10	04/13	04/22	04/28	05/01	05/01	16
2014	04/01	04/22	04/29	04/29	04/30	05/01	05/01	05/01	3

Table 3. Window counts of wild adult steelhead passing the Ice Harbor south fishway during the first ten days of April, 2007 – 2014.

Day	Year								Mean
	2007	2008	2009	2010	2011	2012	2013	2014	
1	46	29	16	41	62	61	16	10	**35**
2	36	22	38	62	104	7	25	13	**38**
3	29	17	33	45	52	3	66	13	**32**
4	28	18	61	45	49	-1	61	20	**35**
5	28	44	51	33	50	7	82	35	**41**
6	27	26	26	46	11	21	51	6	**27**
7	37	40	13	50	7	23	73	28	**34**
8	34	90	17	54	2	8	66	25	**37**
9	17	51	39	38	2	5	50	17	**27**
10	21	58	40	15	10	27	47	24	**30**

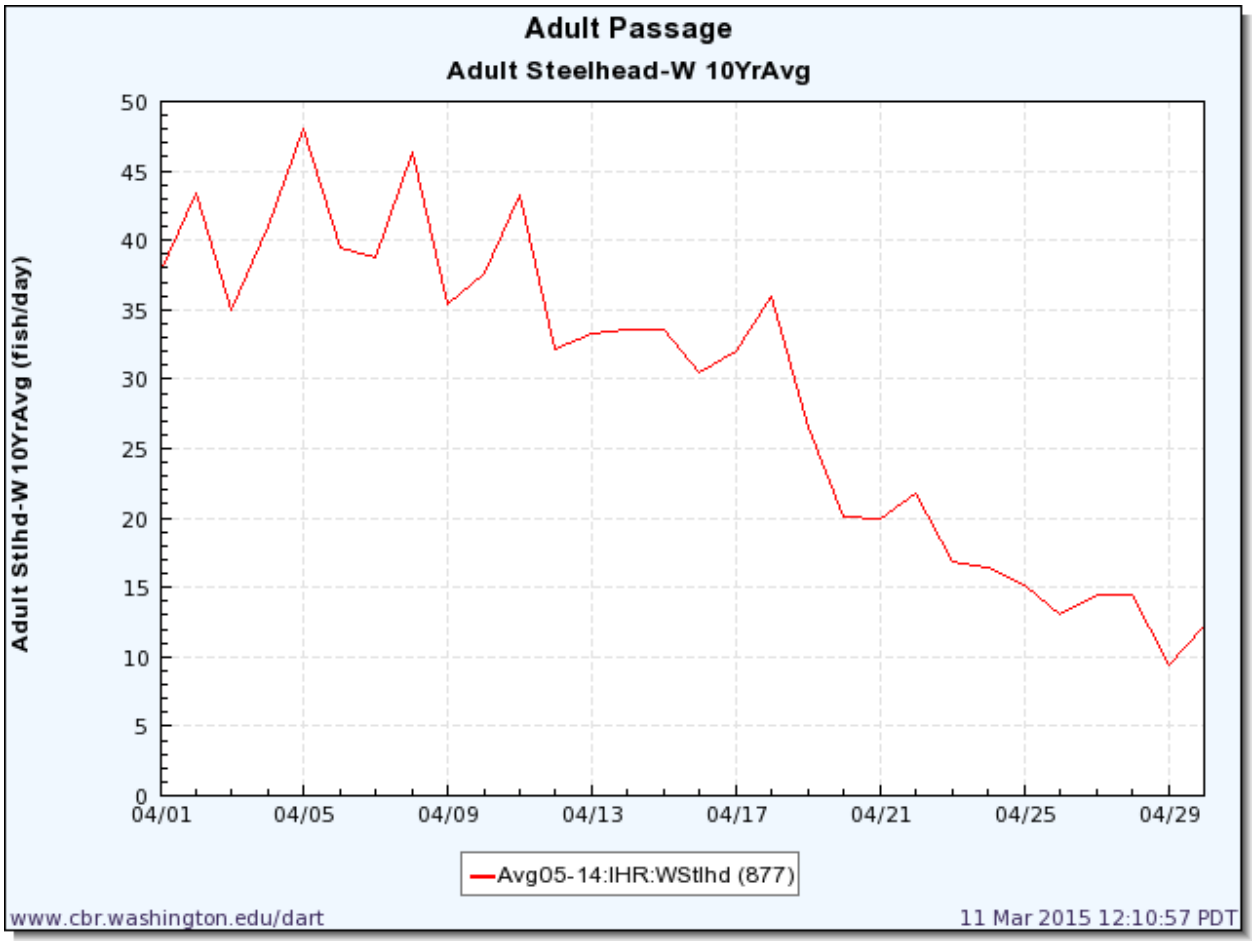

Figure 1. Ten year average daily wild adult steelhead passage at Ice Harbor Dam during the month of April (DART 2015).

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